

SEQUENCE LISTING

<110> Georgia Tech Research Corporation
Donald, Doyle F.
Bahareh, Azizi
Lauren, Schwimmer J.

<120> ENGINEERING ENZYMES THROUGH GENETIC SELECTION

<130> 820701-2810

<150> 60/520,754
<151> 2003-11-17

<150> 60/520,813
<151> 2003-11-17

<160> 18

<170> PatentIn version 3.3

<210> 1
<211> 17
<212> DNA
<213> artificial sequence

<220>
<223> Cassette 1, F

<400> 1
cggaatttcc catgggc
17

<210> 2
<211> 37
<212> DNA
<213> artificial sequence

<220>
<223> BPf

<400> 2
ctcgccgaac gaccggtca ccgcatgcc ctagtgg
37

<210> 3
<211> 36
<212> DNA
<213> artificial sequence

<220>
<223> BPr

<400> 3
ccgcttg gcc cactccacta gtggcatgcg gtgacc
36

<210> 4

<211> 37
<212> DNA
<213> artificial sequence

<220>
<223> cassette 2, BPf, BPr, SEf

<400> 4
cgggcaggct ggaatgagct cctcgacgga attctcc
37

<210> 5
<211> 36
<212> DNA
<213> artificial sequence

<220>
<223> SEr

<400> 5
cagcccgggtg gccaggagaa ttccgtcgag gagctc
36

<210> 6
<211> 40
<212> DNA
<213> artificial sequence

<220>
<223> cassette 3, SEf, SEr, AMf

<400> 6
ctctgcgctc catcgggctt aagtgccac caattgacac
40

<210> 7
<211> 46
<212> DNA
<213> artificial sequence

<220>
<223> AMr

<400> 7
ctccagcatc tccataagga aggtgtcaat tgggtgggcac ttaagc
46

<210> 8
<211> 17
<212> DNA
<213> artificial sequence

<220>
<223> cassette 4, AMf, AMr, and R

<400> 8

caaaggatgg gccgcag
17

<210> 9
<211> 46
<212> DNA
<213> artificial sequence

<220>
<223> oligos BP1

<400> 9
ggcaaacatg gggctgaacc ccagctcgcc gaacgacccg gtcacc
46

<210> 10
<211> 66
<212> DNA
<213> artificial sequence

<220>
<223> BP2

<220>
<221> misc_feature
<222> (33)..(33)
<223> A, C or T

<220>
<221> misc_feature
<222> (34)..(34)
<223> A or G

<220>
<221> misc_feature
<222> (35)..(35)
<223> C or G

<220>
<221> misc_feature
<222> (36)..(36)
<223> A, C or T

<220>
<221> misc_feature
<222> (37)..(37)
<223> A or G

<220>
<221> misc_feature
<222> (38)..(38)
<223> C or G

<220>
<221> misc_feature
<222> (45)..(45)
<223> A, C or T

<220>
<221> misc_feature
<222> (46)..(46)
<223> A or G

<220>
<221> misc_feature
<222> (47)..(47)
<223> C or G

<400> 10
gccactcca ctagtgtgaa aagctgtttg tcnnnnnntt ggcanngttg gtgaccgggt
60

cgtttcg
66

<210> 11
<211> 48
<212> DNA
<213> artificial sequence

<220>
<223> BP3

<400> 11
cttttcacac tagtggagtg ggccaagcgg atcccacact tctcagag
48

<210> 12
<211> 28
<212> DNA
<213> artificial sequence

<220>
<223> BP4

<400> 12
ggggcagctc tgagaagtgt gggatccg
28

<210> 13
<211> 48
<212> DNA
<213> artificial sequence

<220>
<223> SE1

<220>
<221> misc_feature
<222> (22)..(22)
<223> A, G or T

<220>
<221> misc_feature
<222> (23)..(23)

<223> C or T

<220>

<221> misc_feature

<222> (24)..(24)

<223> G or C

<220>

<221> misc_feature

<222> (31)..(31)

<223> A, G or T

<220>

<221> misc_feature

<222> (32)..(32)

<223> C or T

<220>

<221> misc_feature

<222> (33)..(33)

<223> G or C

<400> 13

gcaggctgga atgagctcct cnnngcctcc nnntcccacc gctccatc
48

<210> 14

<211> 46

<212> DNA

<213> artificial sequence

<220>

<223> SE2

<400> 14

ccggtggcca ggagaattcc gtccttcacg gcgatggagc ggtggg
46

<210> 15

<211> 63

<212> DNA

<213> artificial sequence

<220>

<223> AM1

<220>

<221> misc_feature

<222> (38)..(38)

<223> A, G or T

<220>

<221> misc_feature

<222> (39)..(39)

<223> C or T

<220>

<221> misc_feature

<222> (40)..(40)
<223> G or C

<400> 15
ggctctgcgc tccatcgggc ttaagtgcct ggaacatnnn ttscttcttc aagctcatcg
60

ggg
63

<210> 16
<211> 51
<212> DNA
<213> artificial sequence

<220>
<223> AM2

<400> 16
gcatctcaat aaggaagggtg tcaattgtgt gtccccgatg agcttgaaga a
51

<210> 17
<211> 12414
<212> DNA
<213> artificial sequence

<220>
<223> pGAD10BA seq 020803

<400> 17
gcttgcacgc aacttctttt cttttttttt cttttctctc tcccccggtg ttgtctcacc
60

atatccgcaa tgacaaaaaa aatgatggaa gacactaaag gaaaaaatta acgacaaaaga
120

cagcaccaac agatgtcgtt gttccagagc tgatgagggg tatcttcgaa cacacgaaac
180

tttttccttc cttcattcac gcacactact ctctaataag caacggtata cggccttcct
240

tccagttact tgaatttgaa ataaaaaaag tttgccgctt tgctatcaag tataaataga
300

cctgcaatta ttaatctttt gtttctctgt cattgttctc gttcccttcc ttccttggtt
360

ctttttctgc acaatatttc aagctatacc aagcatataa tcaactccaa gctttgcaaa
420

gatggataaa gcggaattaa ttccccgagcc tccaaaaaag aagagaaagg tcgaattggg
480

taccgccgcc aattttaatc aaagtgggaa tattgctgat agctcattgt ccttcacttt
540

cactaacagt agcaacggtc cgaacctcat aacaactcaa acaaattctc aagcgctttc
600

acaaccaatt gcctcctcta acgttcatga taacttcatg aataatgaaa tcacggctag
660

taaaattgat gatggtaata attcaaaacc actgtcacct gggtggacgg accaaactgc
720

gtataacgag tttggaatca ctacagggat gtttaatacc actacaatgg atgatgtata
780

taactatcta ttcgatgatg aagatacccc accaaaccca aaaaaagaga tctttatgag
840

tggattagga gaaaacttgg atccactggc cagtgtattca cgaaaacgca aattgccatg
900

tgatactcca ggacaaggtc ttacctgcag tggtgaaaaa cggagacggg agcaggaaaag
960

taaatatatt gaagaattgg ctgagctgat atctgccaat cttagtata ttgacaattt
1020

caatgtcaaa ccagataaat gtgcgatttt aaaggaaaca gtaagacaga tacgtcaaat
1080

aaaagagcaa ggaaaaacta tttccaatga tgatgatgtt caaaaagccg atgtatcttc
1140

tacagggcag ggagttattg ataaagactc cttaggaccg cttttacttc aggcattgga
1200

tggtttctta tttgtggtga atcgagacgg aaacattgta tttgtatcag aaaatgtcac
1260

acaatacctg caatataagc aagaggacct ggttaacaca agtggtttaca atatcttaca
1320

tgaagaagac agaaaggatt ttcttaagaa tttacaaaaa tctacagtta atggagtctc
1380

ctggacaaat gagacccaaa gacaaaaaag ccatacatctt aattgccgta tgttgatgaa
1440

aacaccacat gatattctgg aagacataaa cgccagtcct gaaatgcgcc agagatatga
1500

aacaatgcag tgctttgccc tgtctcagcc acgagctatg atggaggaag ggggaagattt
1560

gcaatcttgt atgatctgtg tggcacgcgc cattactaca ggagaaagaa catttccatc
1620

aaaccctgag agctttatta ccagacatga tctttcagga aaggttgtca atatagatac
1680

aaattcactg agatcctcca tgaggcctgg ctttgaagat ataatccgaa ggtgtattca
1740

gagatttttt agtctaaatg atgggcagtc atgggtcccag aaacgtcact atcaagaagt
1800

taccagtgat gggatatttt ccccaacagc ttatcttaat ggccatgcag aaacccagc
1860

atatcgattc tcgttggtg atggaactat agtgactgca cagacaaaaa gcaaactctt
1920

ccgaaatcct gtaacaaatg atcgacatgg ctttgtctca acccacttcc ttcagagaga
1980

acagaatgga tatagaccaa acccaaatcc tggtggacaa gggattagac cacctatggc
2040

tggatgcaac agttcggtag gcggcatgag tatgtcgcca aaccaaggct tacagatgcc
2100

gagcagcagg gcctatggct tggcagaccc tagcaccaca gggcagatga gtggagctag
2160

gtatgggggt tccagtaaca tagcttcatt gaccctggg ccaggcatgc aatcaccatc
2220

ttcctaccag aacaacaact ataggctcaa catgagtagc cccccacatg ggagtcttgg
2280

tcttgcccca aaccagcaga atatcatgat ttctcctcgt aatcgtggga gtccaaagat
2340

agcctcacat cagttttctc ctgttgacgg tgtgactct cccatggcat cttctggcaa
2400

tactgggaac cacagctttt ccagcagctc totcagtgcc ctgcaagcca tcagtgaagg
2460

tgtggggact tcccttttat ctactctgtc atcaccaggc cccaaattgg ataactctcc
2520

caatatgaat attacccaac caagtaaagt aagcaatcag gattccaaga gtcctctggg
2580

cttttattgc gacaaaaatc cagtggagag ttcaatgtgt cagtcaaata gcagagatca
2640

cctcagtgc aaagaaagta aggagagcag tggtgagggg gcagagaatc aaaggggtcc
2700

tttgaaagc aaaggtcata aaaaattact gcagttactt acctgttctt ctgatgaccg
2760

gggtcattcc tccttgacca actccccct agattcaagt tgtaaagaat cttctgttag
2820

tgtcaccagc ccctctggag tctcctctc tacatctgga ggagtatcct ctacatccaa
2880

tatgcatggg tcactgttac aagagaagca ccgattttg cacaagttgc tgcagaatgg
2940

gaattcacca gctgaggtag ccaagattac tgcagaagcc actgggaaag acaccagcag
3000

tataacttct tgtggggacg gaaatgttgt caagcaggag cagctaagtc ctaagaagaa
3060

ggagaataat gcacttctta gatacctgct ggacagggat gatcctagtg atgcactctc
3120

taaagaacta cagccccaag tggaaggagt ggataataaa atgagtcagt gcaccagctc
3180

caccattcct agctcaagtc aagagaaaga ccctaaaatt aagacagaga caagtgaaga
3240

gggatctgga gacttggata atctagatgc tattcttggg gatctgacta gttctgactt
3300

ttacaataat tccatatacct caaatggtag tcatctgggg actaagcaac aggtgtttca
3360

aggaactaat tctctgggtt tgaaaagttc acagtctgtg cagtctattc gtcctccata
3420

taaccgagca gtgtctctgg atagccctgt ttctgttggc tcaagtcctc cagtaaaaaa
3480

tatcagtgtt tccccatgt taccaaagca acccatgttg ggtgggaatc caagaatgat
3540

ggatagtcag gaaaattatg gctcaagtat gggagactgg ggcttaccaa actcaaaggc
3600

cggcagaatg gaacctatga attcaaactc catgggaaga ccaggaggag attataatac
3660

ttctttaccc agacctgcac tgggtggctc tattcccaca ttgcctcttc ggtctaatag
3720

cataccaggt gcgagaccag tattgcaaca gcagcagcag atgcttcaaa tgaggcctgg
3780

tgaaatcccc atgggaatgg gggctaatec ctatggccaa gcagcagcat ctaaccaact
3840

gggttcctgg cccgatggca tgttgtccat ggaacaagtt tctcatggca ctcaaaatag
3900

gcctcttctt aggaattccc tggatgatct tgttgggcca ccttccaacc tggaaggcca
3960

gagtgcgaa agagcattat tggaccagct gcacactctt ctgagcaaca cagatgccac
4020

aggcctggaa gaaattgaca gagctttggg cattcctgaa cttgtcaatc agggacaggc
4080

attagagccc aaacaggatg ctttccaagg ccaagaagca gcagtaatga tggatcagaa
4140

ggcaggatta tatggacaga catacccagc acaggggcct ccaatgcaag gaggctttca
4200

tcttcaggga caatcaccat cttttaactc tatgatgaat cagatgaacc agcaaggcaa
4260

ttttcctctc caaggaatgc acccaccagc caacatcatg agaccccgga caaacacccc
4320

caagcaactt agaatgcagc ttcagcagag gctgcagggc. cagcagtttt tgaatcagag
4380

ccgacaggca cttgaattga aaatggaaaa ccctactgct ggtggtgctg cggatgatgag
4440

gcctatgatg cagccccagc agggttttct taatgctcaa atggtcgccc aacgcagcag
4500

agagctgcta agtcactact tccgacaaca gagggtggct atgatgatgc agcagcagca
4560

acagcagcag cagcagcagc agcagcagca acagcaacag caacagcaac agcagcaaca
4620

gcagcaaac caggccttca gcccacctcc taatgtgact gcttccccca gcatggatgg
4680

gcttttggca ggaccacaaa tgccacaagc tcctccgcaa cagtttccat atcaacaaa
4740

ttatggaatg ggacaacaac cagatccagc ctttggtcga gtgtctagtc ctcccaatgc
4800

aatgatgtcg tcaagaatgg gtccctccca gaatcccatg atgcaacacc cgcaggctgc
4860

atccatctat cagtcctcag aaatgaaggg ctggccatca ggaaatttgg ccaggaacag
4920

ctccttttcc cagcagcagt ttgcccacca ggggaatcct gcagtgtata gtatggtgca
4980

catgaatggc agcagtggtc acatgggaca gatgaacatg aaccccatgc ccatgtctgg
5040

catgcctatg ggtcctgatc agaaatactg ctgacatctc tgcaccagga cctcttaagg
5100

aaaccactgt acaaatgaca ctgcactagg attattggga aggaatcatt gttccaggca
5160

tccatcttgg aagaaaggac cagctttgag ctccatcaag ggtattttta gtgatgtcat
5220

ttgagcagga ctggatttta agccgaaggg caatatctac gtgtttttcc cccctccttc
5280

tgctgtgtat catggtgttc aaaacagaaa tgttttttgg cattccacct cctagggata
5340

taattctgga gacatggagt gttactgac ataaaaacttt tgtgtcaactt ttttctgcct
5400

tgctagccaa aatctcttaa atacacgtag gtgggccaga gaacattgga agaatacaaga
5460

gagattagaa tatctggttt ctctagttgc agtattggac aaagagcata gtcccagcct
5520

tcagggtgag tagttctgtg ttgacccttt gtccagtgga attggtgatt ctgaattgtc
5580

ctttactaat ggtgttgagt tgctctgtcc ctattatttg ccctaggctt tctcctaata
5640

aaggttttca tttgccattc atgtcctgta atacttcacc tccaggaact gtcattggatg
5700

tccaaatggc tttgcagaaa ggaaatgaga tgacagtatt taatcgagc agtagcaaac
5760

ttttcacatg ctaatgtgca gctgagtgc ctttatttaa aaagaatgga taaatgcaat
5820

attcttgagg tcttgaggga atagtgaac acattcctgg tttttgccta cacttacgtg
5880

ttagacaaga actatgattt ttttttttaa agtactggtg tcacccttg cctatatggt
5940

agagcaataa tgctttttta aaataaactt ctgaaaaccc aaggccaggt actgcattct
6000

gaatcagaat ctgcagtggt ttctgtgaat agattttttt gtaaataatga cctttaagat
6060

attgtattat gtaaaatatg tatatacctt tttttgtagg tcacaacaac tcatttttac
6120

agagtttgtg aagctaaata ttttaacattg ttgatttcag taagctgtgt ggtgaggcta
6180

ccagtggaag agacatccct tgacttttgt ggcctggggg aggggtagtg caccacagct
6240

tttcctccc cccccccag ccttagatgc ctgcctctt tcaatctctt aatctaaatg
6300

ctttttaag agattatttg tttagatgta agcattttta ttttttaaaa attcctctac
6360

cagaactaag cactttgtta atttgggggg aaagaataga tatggggaaa taaacttaaa
6420

aaaaaatcag gaatttaaaa aaaacgagca atttgaagag aatcttttgg attttaagca
6480

gtccgaaata atagcaattc atgggctgtg tgtgtgtgtg tatgtgtgtg tgtgtgtgtg
6540

tatgtttaat tatgttacct tttcatcccc tttaggagcg ttttcagatt ttggttcgta
6600

agacctgaat cccgcggccg ccccgggcgt agatactgaa aaaccccgca agttcacttc
6660

aactgtgcat cgtgcaccat ctcaatttct ttcatttata catcgttttg ccttctttta
6720

tgtaactata ctctcttaag tttcaatctt ggccatgtaa cctctgatct atagaatttt
6780

ttaaagtact agaattaatg cccatctttt ttttggacct aaattcttca tgaaaatata
6840

ttacgagggc ttattcagaa gctttggact tcttcgccag aggtttggtc aagtctccaa
6900

tcaaggttgt cggcttgtct accttgccag aaatttacga aaagatggaa aaggggtcaaa
6960

tcgttggtag atacgttggt gacacttcta aataagcgaa tttcttatga tttatgattt
7020

ttattattaa ataagttata aaaaaataa gtgtatacaa attttaaagt gactcttagg
7080

ttttaaaacg aaaattcttg ttcttgagta actctttcct gtaggtcagg ttgctttctc
7140

aggtatagca tgaggtcgct cttattgacc acacctctac cggcatgccc gaaattcccc
7200

taccctatga acatattcca ttttgtaatt tcgtgtcggt tctattatga atttcattta
7260

taaagtttat gtacaaatat cataaaaaaa gagaatcttt ttaagcaagg attttcttaa
7320

cttcttcggc gacagcatca ccgacttcgg tgggtactgtt ggaaccacct aaatcaccag
7380

ttctgatacc tgcattccaa acctttttta ctgcatcttc aatggcctta ccttcttcag
7440

gcaagttcaa tgacaatttc aacatcattg cagcagacaa gatagtggcg ataggggtcaa
7500

ccttattctt tggcaaactc ggagcagaac cgtggcatgg ttcgtacaaa ccaaagtcgg
7560

tgttcttgtc tggcaaagag gccaaaggac cagatggcaa caaacccaag gaacctggga
7620

taacggaggc ttcacggag atgatatcac caaacatgtt gctgggtgatt ataataccat
7680

ttaggtgggt tgggttctta actaggatca tggcggcaga atcaatcaat tgatgttgaa
7740

ccttcaatgt aggaaattcg ttcttgatgg tttcctccac agtttttctc cataatcttg
7800

aagaggccaa aacattagct ttatccaagg accaaatagg caatgggtggc tcatgttgta
7860

gggccatgaa agcggccatt cttgtgattc ttgacacttc tggaacgggtg tattgttcac
7920

tatcccaagc gacaccatca ccacgtctt cttttctctt accaaagtaa atacctccca
7980

ctaattctct gacaacaacg aagtcagtac ctttagcaaa ttgtggcttg attggagata
8040

agtctaaaag agagtcggat gcaaagttac atgggtcttaa gttggcgtac aattgaagtt
8100

ctttaaggat ttttagtaaa cttgttcag gtctaact acctgtaccc catttaggac
8160

cacccacagc acctaacaaa acggcatcaa ctttcttgga ggcttcagc gcctcatctg
8220

gaagtgggac acctgtagca tcgatagcag caccaccaat taaatgattt tcgaaatcga
8280

acttgacatt ggaacgaaca tcagaaatag ctttaagaac cttaatggct tcggctgtga
8340

tttcttgacc aacgtggtca cctggcaaaa cgacgatctt cttaggggca gacattagaa
8400

tggtatatcc ttgaaatata tatatatatt gctgaaatgt aaaaggtaag aaaagttaga
8460

aagtaagacg attgctaacc acctattgga aaaaacaata ggtccttaaa taatattgtc
8520

aacttcaagt attgtgatgc aagcatttag tcatgaacgc ttctctattc tatatgaaaa
8580

gccggttcg gcctctcacc tttccttttt ctcccaattt ttcagttgaa aaaggatat
8640

gcgtcaggcg acctctgaaa ttaacaaaaa atttccagtc atcgaatttg attctgtgcg
8700

atagcgcgcc tgtgtgttct cgttatgttg aggaaaaaaa taatgggtgc taagagattc
8760

gaactcttgc atcttacgat acctgagtat tcccacagtt ggggatctcg actctagcta
8820

gaggatcaat tcgtaatcat ggtcatagct gtttctctgtg tgaaattggt atccgctcac
8880

aattccacac aacatacgag ccggaagcat aaagtgtaaa gcctgggggtg cctaagagt
8940

gaggtaactc acattaattg cggttgcgctc actgcccgtt ttccagtcgg gaaacctgtc
9000

gtgccagctg gattaatgaa tcggccaacg cgcggggaga ggcggtttgc gtattgggag
9060

ctcttcgctt tcttcgctca ctgactcgct gcgctcggtc gttcggtgc ggcgagcgg
9120

atcagctcac tcaaaggcgg taatacgggt atccacagaa tcaggggata acgcaggaaa
9180

gaacatgtga gcaaaaggcc agcaaaaggc caggaaccgt aaaaaggccg cggtgctggc
9240

gtttttccat aggctccgcc cccctgacga gcatcacaaa aatcgacgct caagtcagag
9300

gtggcgaaac ccgacaggac tataaagata ccaggcggtt cccctggaa gctccctcgt
9360

gcgctctcct gttccgaccc tgccgcttac cggatacctg tccgccttcc tcccttcggg
9420

aagcgtggcg ctttctcata gctcacgctg taggtatctc agttcggtgt aggtcgttcg
9480

ctccaagctg ggctgtgtgc acgaaccccc cggtcagccc gaccgctgcg ccttatccgg
9540

taactatcgt cttgagtcca acccggttaag acacgactta tcgccactgg cagcagccac
9600

tggtaacagg attagcagag cgaggatatgt aggcgggtgt acagagttct tgaagtgggt
9660

gcctaactac ggctacacta gaaggacagt atttgggtatc tgcgctctgc tgaagccagt
9720

taccttcgga aaaagagttg gtagctcttg atccggcaaa caaaccaccg ctggtagcgg
9780

tggttttttt gtttgcaagc agcagattac gcgcagaaaa aaaggatctc aagaagatcc
9840

tttgatcttt tctacggggt ctgacgctca gtggaacgaa aactcacgtt aagggatttt
9900

ggtcatgaga ttatcaaaaa ggatcttcac ctagatcctt ttaaattaa aatgaagttt
9960

taaatcaatc taaagtatat atgagtaaac ttggtctgac agttaccaat gcttaatcag
10020

tgaggcacct atctcagcga tctgtctatt tcgttcaccc atagttgcct gactccccgt
10080

cgtgtagata actacgatac gggagggtt accatctggc cccagtgcgt caatgatacc
10140

gcgagaccca cgctcaccgg ctccagattt atcagcaata aaccagccag ccggaagggc
10200

cgagcgcaga agtggctcctg caactttatc cgcctccatc cagtctatta attggtgccg
10260

ggaagctaga gtaagtagtt cgccagttaa tagtttgccg aacgttggtg ccattgctac
10320

aggcatcgtg gtgtcacgct cgtcgtttgg tatggcttca ttcagctccg gttcccaacg
10380

atcaaggcga gttacatgat ccccatgtt gtgcaaaaaa gcggttagct ccttcggtcc
10440

tccgatcgtt gtcagaagta agttggccgc agtggtatca ctcattggta tggcagcact
10500

gcataattct cttactgtca tgccatccgt aagatgcttt tctgtgactg gtgagtactc
10560

aaccaagtca ttctgagaat agtgtatgcg gcgaccgagt tgctcttgcc cggcgtcaat
10620

acgggataat accgcgccac atagcagaac tttaaaagtg ctcattcattg gaaaacgttc
10680

ttcggggcga aaactctcaa ggatcttacc gctgttgaga tccagttcga tgtaaccac
10740

tcgtgcaccc aactgatctt cagcatcttt tactttcacc agcgtttctg ggtgagcaaa
10800

aacaggaagg caaaatgccg caaaaaaggg aataagggcg acacggaaat gttgaatact
10860

catactcttc ctttttcaat attattgaag catttatcag ggttattgtc tcatgagcgg
10920

atacatattt gaatgtattt agaaaaataa acaaataagg gttccgcgca catttccccg
10980

aaaagtgcc cctgacgtct aagaaaccat tattatcatg acattaacct ataaaaatag
11040

gcgtatcacg aggccctttc gtctcgcgcg tttcgggtgat gacggtgaaa acctctgaca
11100

catgcagctc ccggagacgg tcacagcttg tctgtaagcg gatgccggga gcagacaagc
11160

ccgtcagggc gcgtcagcgg gtggtggcgg gtgtcggggc tggcttaact atgcggcatc
11220

agagcagatt gtactgagag tgcaccataa cgcatttaag cataaacacg cactatgccg
11280

ttcttctcat gtatatatat atacaggcaa cacgcagata taggtgcgac gtgaacagtg
11340

agctgtatgt ggcgagctcg cgttgcattt tcggaagcgc tcgttttcgg aaacgctttg
11400

aagttcctat tccgaagttc ctattctcta gctagaaagt ataggaactt cagagcgctt
11460

ttgaaaacca aaagcgctct gaagacgcac tttcaaaaaa ccaaaaacgc accggactgt
11520

aacgagctac taaaatattg cgaataccgc ttccacaaac attgctcaaa agtatctctt
11580

tgctatatat ctctgtgcta tatccctata taacctacce atccaccttt cgctccttga
11640

acttgcattt aaactcgacc tctacatttt ttatgtttat ctctagtatt actctttaga
11700

caaaaaaatt gtagtaagaa ctattcatag agtgaatcga aaacaatacg aaaatgtaaa
11760

catttcctat acgtagtata tagagacaaa atagaagaaa ccgttcataa ttttctgacc
11820

aatgaagaat catcaacgct atcactttct gttcaciaaag tatgcgcaat ccacatcggt
11880

atagaatata atcggggatg cctttatctt gaaaaaatgc acccgagct tcgctagtaa
11940

tcagtaaacy cggaagtgg agtcaggctt tttttatgga agagaaaata gacaccaaag
12000

tagccttctt ctaaccttaa cggacctaca gtgcaaaaag ttatcaagag actgcattat
12060

agagcgcaca aaggagaaaa aaagtaatct aagatgcttt gttagaaaaa tagcgctctc
12120

gggatgcatt tttgtagaac aaaaaagaag tatagattct ttgttggtaa aatagcgctc
12180

tcgcgttgca tttctgttct gtaaaaatgc agctcagatt ctttgtttga aaaattagcg
12240

ctctcgcgtt gcatttttgt tttacaaaaa tgaagcacag attcttcggt ggtaaaatag
12300

cgcttttcgag ttgcatttct gttctgtaaa aatgcagctc agattctttg tttgaaaaat
12360

tagcgctctc gcgttgcat tttgttctac aaaatgaagc acagatgctt cggt
12414

<210> 18
<211> 7254
<212> DNA
<213> artificial sequence

<220>

<223> pGBDRXRalpha

<400> 18

gcttgcatgc aacttctttt cttttttttt cttttctctc tccccggtg ttgtctcacc
60

atatccgcaa tgacaaaaaa aatgatggaa gacactaaag gaaaaaatta acgacaaaga
120

cagcaccaac agatgtcgtt gttccagagc tgatgagggg tatcttcgaa cacacgaaac
180

tttttccttc cttcattcac gcacactact ctctaataag caacggtata cggccttcct
240

tccagttact tgaatttgaa ataaaaaaag tttgccgctt tgctatcaag tataaataga
300

cctgcaatta ttaatctttt gtttctctgt cattgttctc gttccctttc ttccttgttt
360

ctttttctgc acaatatttc aagctatacc aagcatataa tcaactccaa gcttgaagca
420

agcctcctga aagatgaagc tactgtcttc tatogaacaa gcatgagata tttgccgact
480

taaaaagctc aagtgtcca aagaaaaacc gaagtgcgcc aagtgtctga agaacaactg
540

ggagtgtcgc tactctccca aaacaaaaag gtctccgctg actagggcac atctgacaga
600

agtggaatca aggctagaaa gactggaaca gctatttcta ctgatttttc ctcgagaaga
660

ccttgacatg attttgaaaa tggattcttt acaggatata aaagcattgt taacaggatt
720

atgtgtacaa gataatgtga ataaagatgc cgtcacagat agattggctt cagtggagac
780

tgatatgcct ctaacattga gacagcatag aataagtgcg acatcatcat cggaagagag
840

tagtaacaaa ggtcaaagac agttgactgt atcgccggaa ttcccgggac agctgcattc
900

tcccatcagc accctgagct ccccatcaa cggcatgggc ccgcctttct cgggtcatcag
960

ctcccccatg ggcccccaact ccatgtcggg gccaccaca cccaccctgg gcttcagcac
1020

tggcagcccc cagctcagct cacctatgaa ccccgtcagc agcagcgagg acatcaagcc
1080

ccccctgggc ctcaatggcg tctcaaggt ccccgccac ccctcaggaa acatggcttc
1140

cttcaccaag cacatctgcg ccattctgcg ggaccgctcc tcaggcaagc actatggagt
1200

gtacagctgc gaggggtgca agggcttctt caagcggacg gtgcgcaagg acctgacctt
1260

cacctgccgc gacaacaagg actgcctgat tgacaagcgg cagcggaacc ggtgccagta
1320

ctgccgtac cagaagtgcc tggccatggg catgaagcgg gaagccgtgc aggaggagcg
1380

gcagcgtggc aaggaccgga acgagaatga ggtggagtcg accagcagcg ccaacgagga
1440

catgccggtg gagaggatcc tggaggctga gctggccgtg gagcccaaga ccgagacctt
1500

cgtggaggca aacatggggc tgaaccccag ctgcgcgaac gaccctgtca ccaacatttg
1560

ccaagcagcc gacaaacagc ttttcaccct ggtggagtgg gccaaagcgg tcccacactt
1620

ctcagagctg cccctggacg accaggtcat cctgctgcgg gcaggctgga atgagctgct
1680

catgcctcc ttctcccacc gctccatcgc cgtgaaggac gggatcctcc tggccaccgg
1740

gctgcacgtc caccggaaca gcgcccacag cgcaggggtg ggcgccatct ttgacagggt
1800

gctgacggag cttgtgtcca agatgcggga catgcagatg gacaagacgg agctgggctg
1860

cctgcgcgcc atcgtcctct ttaaccctga ctccaagggg ctctcgaacc cggccgagggt
1920

ggaggcgctg agggagaagg tctatgcgtc cttggaggcc tactgcaagc acaagtaccc
1980

agagcagccg ggaagggtcg ctaagctctt gctccgctg ccggctctgc gctccatcgg
2040

gctcaaattg ctggaacatc tcttcttctt caagctcatc ggggacacac ccattgacac
2100

cttccttatg gagatgctgg aggcgcgcga ccaaattgact taggcctgcg ggcccatcct
2160

ttgtgcccac ccgttctggc caccctgcct ggacgccagc tgttcttctc agcctgagcc
2220

ctgtccctgc ctttctctgc ctggcctggt tggactttgg ggcacagct gtcactgctc
2280

tgcctaagag atgtgttgct accctcctta tttctgttac tacttgctg tggcccaggg
2340

cagtggcttt cctgagcagc agccttcgtg gcaagaacta gcgtgagccc agccaggcgc
2400

ctccccaccg ggctctcagg acgccctgcc acaccacgg ggcttgggcg actacagggg
2460

cttcggcccc agccctggag ctgcagccaa gctaattccg ggcgaatttc ttatgattta
2520

tgatttttat tattaaataa gttataaaaa aaataagtgt atacaaattt taaagtgact
2580

cttaggtttt aaaacgaaaa ttcttgttct tgagtaactc tttcctgtag gtcaggttgc
2640

ttctcaggt atagcatgag gtcgctctta ttgaccacac ctctaccggc atgccggcaa
2700

gtgcacaaac aatacttaaa taaatactac tcagtaataa cctatttctt agcatttttg
2760

acgaaatttg ctattttgtt agagtctttt acaccatttg tctccacacc tccgcttaca
2820

tcaacaccaa taacgccatt taatctaagc gcatcaccaa cattttcttg cgtcagtcca
2880

ccagctaaca taaaatgtaa gctttcgggg ctctcttgcc ttccaacca gtcagaaatc
2940

gagttccaat ccaaaagttc acctgtccca cctgcttctg aatcaaacia ggaataaac
3000

gaatgaggtt tctgtgaagc tgcactgagt agtatgttgc agtcttttgg aaatacgagt
3060

cttttaataa ctggccttac tccaaagaca cttcgacgtg actcatcata caacgtcaga
3120

aaacctttat gctcagaaaa ttattgaccg aaaccgagga actcttggtt ttcttgccac
3180

gactcatctc catgcagttg gacgatatca atgccgtaat cattgaccag agccaaaaca
3240

tcctccttag gttgattacg aaacacgcca accaagtatt tcggagtgcc tgaactattt
3300

ttatatgctt ttacaagact tgaaattttc cttgcaataa ccgggtcaat tgttctcttt
3360

ctattgggca cacatataat acccagcaag tcagcatcgg aatctagagc acattctgcg
3420

gcctctgtgc tctgcaagcc gcaaactttc accaatggac cagaactacc tgtgaaatta
3480

ataacagaca tactccaagc tgcctttgtg tgcttaatca cgtatactca cgtgctcaat
3540

agtcaccaat gccctccctc ttggccctct ccttttcttt ttctgaccga attaatctgt
3600

aatcatgggtc atagctgttt cctgtgtgaa attgttatcc gctcacaatt ccacacaaca
3660

tacgagccgg aagcataaag tgtaaagcct ggggtgccta atgagtgagg taactcacat
3720

taattgcgtt gcgtcactg cccgctttcc agtcgggaaa cctgtcgtgc cagctggatt
3780

aatgaatcgg ccaacgcgcg gggagaggcg gtttgcgtat tgggcgctct tccgcttcc
3840

cgctcactga ctgctgcgc tcggtcgttc ggctgcggcg agcggatatca gctcactcaa
3900

aggcggtaat acggttatcc acagaatcag gggataacgc aggaaagaac atgtgagcaa
3960

aaggccagca aaaggccagg aaccgtaaaa aggcgcggtt gctggcggtt ttccataggc
4020

tccgcccccc tgacgagcat cacaaaaatc gacgctcaag tcagaggtgg cgaaaccga
4080

caggactata aagataccag gcgtttcccc ctggaagctc cctcgtgcgc tctcctgttc
4140

cgaccctgcc gcttaccgga tacctgtccg cctttctccc ttcggaagc gtggcgctt
4200

ctcatagctc acgctgtagg tatctcagtt cgggtgtagg cgttcgctcc aagctgggt
4260

gtgtgcacga accccccgtt cagcccgacc gctgcgcctt atccggtaac tatcgtcttg
4320

agtccaaccc ggtaagacac gacttatcgc cactggcagc agccactggt aacaggatta
4380

gcagagcgag gtatgtaggc ggtgctacag agttcttgaa gtggtggcct aactacggct
4440

acactagaag gacagtattt ggtatctgcg ctctgctgaa gccagttacc ttcggaaaaa
4500

gagttggtag ctcttgatcc ggcaaaaaa ccaccgctgg tagcgggtgt tttttgttt
4560

gcaagcagca gattacgcgc agaaaaaaag gatctcaaga agatcctttg atcttttcta
4620

cggggtctga cgctcagtg aacgaaaact cacgttaagg gattttggc atgagattat
4680

caaaaaggat cttcacctag atccttttaa attaaaaatg aagttttaaa tcaatctaaa
4740

gtatatatga gtaaacttgg tctgacagtt accaatgctt aatcagtgag gcacctatct
4800

cagcgatctg tctatttcgt tcatccatag ttgcctgact ccccgctctg tagataacta
4860

cgatacggga gggcttacca tctggcccca gtgctgcaat gataccgcga gaccacgct
4920

caccggctcc agatttatca gcaataaacc agccagccgg aagggccgag cgcagaagtg
4980

gtcctgcaac tttatccgcc tccatccagt ctattaattg ttgccgggaa gctagagtaa
5040

gtagtctgcc agttaatagt ttgcgcaacg ttgttgccat tgctacaggc atcgtggtgt
5100

cacgctctgc gtttggtatg gcttcattca gctccggttc ccaacgatca aggcgagtta
5160

catgatcccc catgttgtgc aaaaaagcgg ttagctcctt cggtcctcgg atcgttgtca
5220

gaagtaagtt ggccgcagtg ttatcactca tggttatggc agcactgcat aattctctta
5280

ctgtcatgcc atccgtaaga tgcttttctg tgactgggtga gtactcaacc aagtcattct
5340

gagaatagtg tatgcggcga ccgagttgct cttgcccggc gtcaatacgg gataataccg
5400

cgccacatag cagaacttta aaagtgtca tcattggaaa acgttcttcg gggcgaaaac
5460

tctcaaggat cttaccgctg ttgagatcca gttcgatgta acccactcgt gcacccaact
5520

gatcttcagc atcttttact ttcaccagcg tttctgggtg agcaaaaaca ggaaggcaaa
5580

atgccgcaaa aaagggaata agggcgacac ggaaatgttg aatactcata ctcttccttt
5640

ttcaatatta ttgaagcatt tatcagggtt attgtctcat gagcggatac atatttgaat
5700

gtatttagaa aaataaacia ataggggttc cgcgcacatt tccccgaaaa gtgccacctg
5760

acgtctaaga aaccattatt atcatgacat taacctataa aaataggcgt atcacgaggc
5820

cctttcgtct cgcgcggttc ggtgatgacg gtgaaaacct ctgacacatg cagctcccgg
5880

agacggtcac agcttgtctg taagcggatg ccgggagcag acaagcccgt cagggcgct
5940

cagcgggtgt tggcgggtgt cggggctggc ttaactatgc ggcacagag cagattgtac
6000

tgagagtgca ccataacgca ttttaagcata aacacgcact atgccgttct tctcatgtat
6060

atatatatac aggcaacacg cagatatagg tgcgacgtga acagtgagct gtatgtgcgc
6120

agctcgcgtt gcattttcgg aagcgcctcg tttcggaac gctttgaagt tctattccg
6180

aagttcctat tctctagcta gaaagtatag gaacttcaga gcgcttttga aaacaaaaag
6240

cgctctgaag acgcactttc aaaaaaccaa aaacgcaccg gactgtaacg agctactaaa
6300

aaacttttgg ttttcgcgag acttctgcgt gaaagttttt tggtttttgc gtggcctgac
6360

attgctcgat gatttatatt gcgaataccg cttccacaaa cattgctcaa aagtatctct
6420

ttgctatata tctctgtgct atatccctat ataacctacc catccacctt tcgctcctg
6480

aacttgcac taaactcgac ctctacattt tttatgttta tctctagtat tactctttag
6540

acaaaaaaat tgtagtaaga actattcata gagtgaatcg aaaacaatac gaaaatgtaa
6600

acatttccta tacgtagtat atagagacaa aatagaagaa accgttcata attttctgac
6660

caatgaagaa tcatcaacgc tatcactttc tgttcacaaa gtatgcgcaa tccacatcgg
6720

tatagaatat aatcggggat gcctttatct tgaaaaaatg caccgcagc ttcgctagta
6780

atcagtaaac gcgggaagtg gagtcaggct ttttttatgg aagagaaaat agacaccaa
6840

gtagccttct tctaacctta acggacctac agtgcaaaaa gttatcaaga gactgcatta
6900

tagagcgac aaaggagaaa aaaagtaatc taagatgctt tgtagaaaa atagcgtct
6960

cgggatgcat tttttagtaa caaaaaagaa gtatagattc tttgttggtt aaatagcgt
7020

ctcgcgttgc atttctgttc tgtaaaaatg cagctcagat tctttgtttg aaaaattagc
7080

gctctcgcgt tgcatttttg ttttacaaaa atgaagcaca gattcttcgt tggtaaaata
7140

gcgctttcgc gttgcatttc tgttctgtaa aaatgcagct cagattcttt gtttgaaaaa
7200

ttagcgctct cgcgttgcac ttttgttcta caaaatgaag cacagatgct tcgt
7254